REMARKS

Reconsideration of the present application is respectfully requested in view of the above amendments and the following remarks.

The applicants note with appreciation the acknowledgement of the claim for priority and the notice that the certified copies have been received.

The abstract of the disclosure was objected to because as being non-descriptive, and the specification was also objected to because of informalities. In response, the applicants have amended the abstract of the disclosure and the specification and now believe these satisfy the examiner's concerns. No new matter has been added.

In particular, the meaning of the letter sigma has been added. This is a conventional use of the Greek letter sigma and is supported by page 1904 of the McGraw-Hill Dictionary of Science and Technical Terms (5^{th} Ed.), a copy of which is attached.

Also, the use of "left" as an adjective has been corrected. The period of time measured from when the film is formed or washed is now referred to as the exposure period.

Regarding the claims, claims 1-7, 9-18 and 20-22 are pending. Claims 8 and 19 have been canceled.

Claims 3, 10, 14 and 21 are rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. Claims 4, 11, 15 and 22 are also rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. However, these claims depend from claims 1, 5, 12 and 16, which recite statutory methods. In addition, these claims have been amended to clarify that each further modifies the method of its parent claim. Therefore, claims 3, 4, 10, 11, 14, 15, 21 and 22 are directed to statutory subject matter. The applicants respectfully request that the rejection based on section 101 be withdrawn.

Claims 1, 5, 12 and 16 are rejected under 35 U.S.C. §112, first paragraph, as containing subject matter not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The office action indicates that the particular method of how to control the exposure period of time is not described by the applicants in the claims nor in the specification. In response, the applicants have amended claim 1, 5, 12 and to change "controlling" to "measuring."

Measuring the exposure period is, for example, performed for determining the thickness of the oxide film within a specific period of time after the gate oxide film is formed (page 7, lines 12-18) and correcting the measured thickness to determine the real thickness based on the measured exposure period (page 10, lines 17-26). Therefore, since the terms in 1, 5, 12 and 16 are definite and explained in original specification, the applicants respectively request that the Examiner's rejection under section 112 be withdrawn

Claims 1, 5, 12 and 16 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the invention.

The office action indicates that applicants do not explain how to measure a thickness by irradiating the object with light. However, the applicants have explained the measurement method in the specification. For example, the thickness of the gate oxide film is measured by an ellipsometer utilizing a polarization analysis (page 5, line 23 to page 6, line 3). The measuring of the thickness of the oxide film by, for example, the ellipsometer is a conventional method of measuring film thickness using light. Specifically, the thickness of the oxide film is measured based on the refractive index and an absorption coefficient (page 1, line 19 to page 2, line 3 and page 5, line 23 to page 6, line 8).

The office action also indicates that it is unclear how the thickness can be measured in accordance with the exposure period. However, the applicants recite a relationship between the exposure period and the apparent thickness of the gate oxide film, and the real thickness of the oxide film can be determined based on a formula (page 9, line 17 to page 10, line 4). Therefore, the applicants believe that specification explains the measurement of the thickness of the oxide film based on the exposure period.

Claims 2, 9, 13 and 20 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that the applicants regard as the invention.

The office action indicates that the applicants fail to particularly point out and distinctly claim how to make an appropriate correction based on the exposure period. However, as recited in the claims, the thickness of the oxide film is corrected based on a relationship between the exposure period and the thickness of the oxide film to obtain the real thickness of the oxide film, which is, for example, expressed as a formula for correcting (page 9, line 17 to page 10, line 4 and page 15, lines 11-20). Therefore, the applicants believe that the specification explains how to make appropriate correction of the thickness of the oxide film based on the exposure period.

Claims 3, 10, 14 and 21 are rejected under 35 U.S.C. §112, second paragraph, in addition to the previous rejection under 35 U.S.C. §101, as containing subject matter not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The office action indicates that neither the specification nor any of the claims teaches how to obtain the factor "a". As recited at page 9, line 24 to page 10, line 4 in the specification, the factor "a" is a constant that is, for example, measured in practice. Therefore, the factor "a" is, for example, defined based on experimental results; thus, users can determine the constant

experimentally and make full use of the invention. The applicants thus request that the rejection of claims 3, 10, 14 and 21 under section 112, second paragraph, be withdrawn.

Claims 3, 10, 14 and 21 are rejected under 35 U.S.C. §112, second paragraph, in addition to the previous rejection under 35 U.S.C. §101 and 35 U.S.C. §112, first paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The office action queries that if "b" is already known as the real thickness of the oxide film, why would anyone spend more time and energy for measuring the parameter once again. However, the thickness of the oxide layer differs based on, for example, producing conditions. Therefore, measuring the thickness of the oxide layer recited in the present invention is conducted on each article to determine which articles have an oxide layer with an appropriate thickness.

Claims 4, 11, 15 and 22 are rejected under 35 U.S.C. §112, second paragraph, in addition to the previous rejection under 35 U.S.C. §101, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In response, the applicants amended claims 4, 11, 15 and 22 to define "T" more appropriately. As recited in specification as amended, "T" indicates a variation in change of thickness of the gate oxide film according to the exposure period of time. Therefore, the applicants believe that claims 4, 11, 15 and 22 are clear.

The rejection of claims 8 and 19 is moot since claims 8 and 19 have been canceled.

Claims 1, 5, 12 and 16 have been rejected under 35 U.S.C. §102(a) and (e) as being anticipated by the patent to Huang. For reasons that will now be discussed, the claims as amended are allowable over the reference cited in the office action. Incidentally, the patent to Huang cannot be used as prior art in a §102(a) rejection because the publication date of the

Huang patent is April 24, 2001, which is after the filing date (July 13, 2000) of the present application. Therefore, the rejection under section 102(a) should be withdrawn.

Amended claims 1, 5, 12 and 16 recite that an exposure period is measured and the thickness of the oxide film is measured by irradiating the oxide film with light, in accordance with the exposure period. The exposure period is defined from a time at which the oxide film is formed to a time at which a thickness of the oxide film is measured. Therefore, the thickness can be measured accurately because the measured thickness may be corrected in accordance with the exposure period (page 2, lines 16-21).

The patent to Huang, however, fails to disclose the use of a relationship between an exposure period and thickness of an oxide film to determine real thickness. The Huang patent only discloses the phenomenon that the thickness of the oxide film increases when the oxide film is exposed to the atmosphere and fails to disclose that the exposure period is measured and the oxide film thickness measurement is conducted within a predetermined time. The patent to Huang discloses the problem and a solution, but the solution disclosed by the patent to Huang is not the solution claimed in the present application. The applicants therefore respectfully request that the §102(a) and (e) rejections of claims 1, 5, 12 and 16 be withdrawn.

Claims 2-4, 9-11, 13-15, and 20-22 have been rejected under 35 USC 103(a) as being unpatentable over the patent to Huang and the prior art disclosed in the patent to Huang. The office action states that it would have been obvious to correct the thickness based on Figure 2 of Huang. However, the patent to Huang fails to suggest using a relationship such as that of his Figure 2 to correct a thickness measurement. In fact, the patent to Huang suggests a different method of solving the problem and thus teaches away from the invention. The Huang patent teaches placing a protective film, which does not interfere with measurements, over the surface

to protect it. Therefore, the applicants respectfully request the withdrawal of the rejection of claims 2-4, 9-11, 13-15, and 20-22 under section 103 based on Huang.

Claims 6, 7, 17, and 18 have been rejected under 35 USC 103(a) as being unpatentable over the patent to Huang as applied to claims 5 and 16 and further in view of the patent to Torii et al. Claims 6, 7, 17 and 18 depend, directly or indirectly, on independent claims 5 and 16. Claims 5 and 16 however recite features not disclosed or suggested in the patent to Huang, as mentioned above, and Huang teaches away from the invention recited in those claims. Therefore, the applicants request that the rejection of claims 6, 7, 17, and 18 under section 103 based on the patent to Huang be withdrawn.

In view of the above amendments and remarks, the present application is now believed to be in condition for allowance. A prompt notice to that effect is respectfully requested. Please charge any unforeseen fees to Deposit Account No. 50-1147.

Respectfully submitted,

J Barlow

James Barlow
Reg. No. 32,377

Law Offices of David G. Posz
2000 L Street, NW
Suite 200
Washington, DC 20036
(202) 416-1638
Customer No. 23400

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McGraw-Hill Dictionary of Science and Technical Terms (5th Edition)

are the differences in right ascension and declination between the position of each star and the assumed position of the plate center. { 'stan·dərd kō'ord·ən·əts }

standard depth-pressure recorder [PETRO ENG] A device for the measurement of pressures at the bottom of a well bore (that is, bottom-hole pressure); a spring-restrained piston moves a recording stylus on a pressure-sealed chart. { 'stan·dərd 'depth 'presh·ər ri'kord·ər }

standard deviate [STAT] For a variable x, the quantity $(x - \bar{x})/\sigma$, where $\bar{x}$ is the mean value of x and σ is the standard deviation of x. { 'stan·dərd 'dē·vē·ət }

standard deviation [STAT] The positive square root of the expected value of the square of the difference between a random variable and its mean. { 'stan·dərd ,dē·vē'ā·shən }

standard electrode potential [PHYS CHEM] The reversible or equilibrium potential of an electrode in an environment where reactants and products are at unit activity. { 'stan·dərd i'lek,trōd pə'ten·chəl }

standard elemental time [IND ENG] A standard time for individual work elements. { 'stan·dərd 'el·ə,ment·əl 'tīm }

standard error [STAT] A measure of the variability any statistical constant would be expected to show in taking repeated random samples of a given size from the same universe of observations. { 'stan·dərd 'er·ər }

standard error of the estimate [STAT] Standard deviation of observed values about the regression line, computed by dividing the unexplained variation or the error sum of squares by its degrees of freedom. { 'stan·dərd 'er·ər əv thē 'es·tə·mət }

standard error of the forecast [STAT] Standard deviation of the estimate (point or interval) of a dependent variable for a given value of an independent variable. { 'stan·dərd 'er·ər əv thē 'for,kast }

standard error of the regression coefficient [STAT] The standard deviation of an estimated regression coefficient, depends on sample size and model assumptions. { 'stan·dərd 'er·ər əv thē ri'gresh·ən ,kō·ə'fish·ənt }

standard evaporator *See* short-tube vertical evaporator. { 'stan·dərd i'vap·ə,rād·ər }

standard fit [DES ENG] A fit whose allowance and tolerance are standardized. { 'stan·dərd 'fit }

standard form [COMPUT SCI] The form of a floating point number whose mantissa lies within a standard specified range of values. { 'stan·dərd 'form }

standard free-energy increase [THERMO] The increase in Gibbs free energy in a chemical reaction, when both the reactants and the products of the reaction are in their standard states. { 'stan·dərd 'frē ,en·ər·jē 'in,krēs }

standard-frequency signal [COMMUN] One of the highly accurate signals broadcast by government radio stations and used for testing and calibrating radio equipment all over the world; in the United States signals are broadcast by the National Bureau of Standards' radio stations WWV, WWVH, WWVB, and WWVL. { 'stan·dərd 'frē·kwən·sē ,sig·nəl }

standard function *See* built-in function. { 'stan·dərd 'fəŋk·shən }

standard gage [CIV ENG] A railroad gage measuring 4 feet 8½ inches (1.4351 meters). [DES ENG] A highly accurate gage used only as a standard for working gages. { 'stan·dərd 'gāj }

standard gold [MET] A gold alloy containing 10% copper; at one time used for legal coinage in the United States. { 'stan·dərd 'gōld }

standard gravity [MECH] A value of the acceleration of gravity equal to 9.80665 meters per second per second. { 'stan·dərd 'grav·əd·ē }

standard heat of formation [THERMO] The heat needed to produce one mole of a compound from its elements in their standard state. { 'stan·dərd 'hēt əv fȯr'mā·shən }

standard hole [DES ENG] A hole with zero allowance plus a specified tolerance; fit allowance is provided for by the shaft in the hole. { 'stan·dərd 'hōl }

standard hour [IND ENG] The quantity of output required of an operator to meet an hourly production quota. Also known as allowed hour. { 'stan·dərd 'aur }

standard-hour plan [IND ENG] A wage incentive plan in which standard work times are expressed as standard hours and the worker is paid for standard hours instead of the actual work hours. { 'stan·dərd 'aur ,plan }

standard illuminants [OPTICS] Three standard sources of light, designated A, B, and C, used in specifying the light used when colors are matched. A is light from a filament at a color temperature of 2575°C, and B and C, representing noon sunlight and normal daylight respectively, are obtained by modifying A with rigorously specified filters. { 'stan·dərd i'lü·mə·nənts }

standard inductor [ELECTROMAG] An inductor (coil) having high stability of inductance value, with little variation of inductance with current or frequency and with a low temperature coefficient; it may have an air core or an iron core; used as a primary standard in laboratories and as a precise working standard for impedance measurements. { 'stan·dərd in'dək·tər }

standard interface [COMPUT SCI] 1. A joining place of two systems or subsystems that has a previously agreed-upon form, so that two systems may be readily connected together. 2. A particular system of uniform circuits and input/output channels connecting the central processing unit of a computer with various units of peripheral equipment. { 'stan·dərd 'in·tər,fās }

standardization [ANALY CHEM] A process in which the value of a potential standard is fixed by a measurement made with respect to a standard whose value is known. [DES ENG] The adoption of generally accepted uniform procedures, dimensions, materials, or parts that directly affect the design of a product or a facility. [ENG] The process of establishing by common agreement engineering criteria, terms, principles, practices, materials, items, processes, and equipment parts and components. { ,stan·dər·də'zā·shən }

standardize [COMPUT SCI] To replace any given floating-point representation of a number with its representation in standard form; that is, to adjust the exponent and fixed-point part so that the new fixed-point part lies within a prescribed standard range. { 'stan·dər,dīz }

standardized product [DES ENG] A product that conforms to specifications resulting from the same technical requirements. { 'stan·dər,dīzd 'präd·əkt }

standardized test statistic [STAT] A test statistic which has been reduced to standardized units. { 'stan·dər,dīzd 'test stə'tis·tik }

standardized units [STAT] A random variable Z has been reduced to standardized units when it has zero expected value and standard deviation 1; this is accomplished by dividing the difference of Z and the expected value of Z by the standard deviation of Z. { 'stan·dər,dīzd 'yü·nəts }

standard leak [ENG] Tracer gas allowed to enter a leak detector at a controlled rate in order to facilitate calibration and adjustment of the detector. { 'stan·dərd 'lēk }

standard lens [OPTICS] Usually the lens provided with a camera as standard equipment; in still cameras, the standard lens is one whose focal length is about equal to the length of the diagonal of the negative area normally provided by the camera; the normal field of view of a standard lens is about 53°. { 'stan·dərd 'lenz }

standard load [DES ENG] A load which has been prepared as to dimensions, weight, and balance, and designated by a number or some classification. { 'stan·dərd 'lōd }

standard loran *See* loran A. { 'stan·dərd 'lō,ran }

standard measure *See* standard score. { 'stan·dərd 'mezh·ər }

standard meridian [GEOD] The meridian used for reckoning standard time; throughout most of the world the standard meridians are those whose longitudes are exactly divisible by 15°. [MAP] A meridian of a map projection along which the scale is as stated. { 'stan·dərd mə'rid·ē·ən }

standard mineral [MINERAL] A mineral that, on the basis of chemical analyses, is theoretically capable of being present in a rock. Also known as normative mineral. { 'stan·dərd 'min·(ə·)rəl }

standard model [PARTIC PHYS] The modern theory of interactions of elementary particles, comprising the Weinberg-Salam theory and quantum chromodynamics. { 'stan·dərd 'mäd·əl }

standard noise temperature [ELECTR] The standard reference temperature for noise measurements, equal to 290 K. { 'stan·dərd 'nȯiz ,tem·prə·chər }

standard noon [ASTRON] Twelve o'clock standard time, or the instant the mean sun is over the upper branch of the standard meridian. { 'stan·dərd 'nün }

standard output [IND ENG] The reciprocal of standard time. { 'stan·dərd 'aut,pu̇t }

standard parallel [MAP] A parallel on a map or chart along which the scale is as stated for that map or chart. [GEOD] ...

MARKED UP VERSION OF SPECIFICATION AND CLAIMS

IN THE SPECIFICATION

Please make the following changes to the paragraph of lines 16-21 of page 2:

According to a first aspect of the present invention, a thickness of an oxide film is measured by controlling [a left period of time for leaving] an exposure time, or period, during which the oxide film is exposed to the atmosphere from the formation of the oxide film to the measurement of the thickness. As a result, the thickness can be measured accurately. The measured thickness may be corrected in accordance with the [left period of time] exposure period.

Please make the following changes to the paragraph beginning on line 22 of page 2 and ending on line 2 of page 3:

According to a second aspect of the present invention, a thickness of an oxide film is measured after washing a surface of the oxide film. The washing of the oxide film removes deposits from the surface of the oxide film, resulting in accurate measurement of the thickness of the oxide film. The [left period of time for leaving] exposure period, during which the oxide film is exposed from the washing to the measurement of the thickness can be controlled to more precisely measure the thickness.

Please make the following changes to the paragraph of lines 22-24 of page 3:

FIG. 3 is a graph showing a relation between an apparent thickness of the gate oxide film and a [left period of time] exposure period elapsed from the formation of the gate oxide film;

Please make the following changes to the paragraph of lines 4-14 of page 6:

This is because it is found that [an] the apparent thickness of the oxide film measured by an optical instrument increases gradually after the oxide film is formed on the substrate. FIG. 3 shows a relation between a change in apparent thickness of the oxide film and a [left period of time] exposure period from the time immediately after the oxide film is formed to the time for measuring the thickness. As shown in the figure, the apparent thickness of the oxide film changes in accordance with the [left period of time] exposure period after the oxide film is formed. The longer the [left period of time] exposure period becomes, the larger the thickness of the oxide film becomes apparently. This phenomenon is considered as follows.

Please make the following changes to the paragraph of lines 4-11 of page 7:

Incidentally, after the surface of the oxide film was washed, the oxide film was [left] exposed to the atmosphere for a specific period of time again, and the change in thickness of the oxide film was measured with respect to the [left period of time] new exposure period. Consequently, substantially the same experimental result as that shown in FIG. 3 was obtained. This result supports that water, carbon, and the like in the air are

attached to the surface of the oxide film to apparently increase the thickness of the oxide film when the oxide film is [left] exposed to the atmosphere.

Please make the following changes to the paragraph that begins on line 23 of page 7 and ends on line 5 of page 8:

For instance, an allowable thickness variation with respect to latitude (specification) for process control can be calculated to determine the period of time for measurement. The thickness variation in the process is calculated by a formula of:

$$\sqrt{S^2 + T^2} \le U \qquad ......(1)$$

where S is a variation in thickness of the gate oxide film, T is a [change-variation] variation in thickness of the gate oxide film according to the [left] exposure period [of time], and U is a specification latitude for the process control. The variation S is calculated at 3σ where σ represents standard deviation, as is generally well known in statistics. The variation S is produced when the gate oxide film is formed. The graph of Fig. 3 varies with every film, and the thickness variation T indicates the variation in thickness that occurs.

Please make the following changes to the paragraph of lines 17-23 of page 9:

As described above, when the gate oxide film 8 is [left] exposed to the atmosphere after its formation, the relation between the apparent thickness of the gate oxide film and the [left] exposure period of time is as shown in FIG. 3. An increase in the apparent thickness of the gate oxide film is represented by an approximate formula of:

$$y = a \cdot \ln(t) + b \qquad ......(2)$$

where $t > 1$, and [an unit of y is] the units of y are $\mathring{A}$.

Please make the following changes to the paragraph beginning at line 24 of page 9 and ending at line 4 of page 10:

In the formula (2), "a" and "b" are constants, and "t" is [a left] an exposure period [of time] elapsed from the formation of the gate oxide film 8 to the measurement of the thickness. The constant a is determined by atmosphere (temperature, moisture) around a wafer disposed within a clean room, or the like, and was in a range of approximately 0.5 to 1.5 when it was measured in practice. The constant b is a thickness of the oxide film measured immediately after the gate oxide film 8 is formed (when t = 1 min).

Please make the following changes to the paragraph of lines 5-16 of page 10:

Incidentally, if the [left] exposure period [of time] t was set to be zero in the formula (2), the thickness of the gate oxide film calculated by the formula (2) is $0\,\mathring{A}$. This means that the gate oxide film 8 does not exist. Therefore, the [left] exposure period [of time] t cannot be set to be less than 1 min when the thickness is measured

immediately after the gate oxide film is formed. In practice, the initial thickness of the gate oxide film 8 is measured after the wafer is taken out of an apparatus for forming the oxide film 8. Because of this, approximately 1 min or more is required to measure the initial thickness of the gate oxide film 8 from the formation of the gate oxide film 8. Therefore, the approximate formula (2) meets the practical use.

Please make the following changes to the paragraph of lines 17-26 of page 10:

Accordingly, the apparent increase in thickness of the gate oxide film 8 is approximated by the formula (2), and calculated in accordance with the [left] <u>exposure</u> period [of time] after the formation of the gate oxide film 8. The thickness of the gate oxide film can be corrected by subtracting the apparent increase in thickness from the measured apparent thickness of the gate oxide film. Thus, the [left] <u>exposure</u> period [of time] is controlled after the gate oxide film 8 is formed, and the apparent thickness of the gate oxide film is corrected by the approximate formula (2). Consequently, the accurate thickness of the gate oxide can be detected.

Please make the following changes to the paragraph beginning at line 27 of page 10 and ending at line 9 of page 11:

FIG. 4 shows variations in thickness of the gate oxide film, quantified by the approximate formula (2) for reference. The result shown in FIG. 4 was obtained by leaving plural samples (samples A-J) for various periods of time, measuring the thickness of the gate oxide film in each sample by an ellipsometer, and correcting the measured result by the formula (2). In the figure, a broken line indicates the measured apparent thicknesses, and a solid line indicates the thicknesses of the gate oxide film after correction. Each [left] <u>exposure</u> period [of time] for each sample is shown above each alphabetical reference.

Please make the following changes to the paragraph of lines 15-25 of page 13:

As shown in the figure, the gate oxide film, which is [left] <u>exposed to the atmosphere</u> for a long period of time after its formation, has an apparently increased thickness, as compared to that immediately after the gate oxide film is formed (when [left] <u>exposure</u> period [of time] is 49 min). As opposed to this, the washing using the mixed solution of H_2SO_4 and H_2O_2 can return the measured thickness of the gate oxide film 8 to approximately its initial value [where] <u>at which</u> the oxide film 8 [is] <u>was</u> not [left] <u>exposed</u> for a long period of time. The experimental results also reveal that the thickness of the gate oxide film 8 can be measured accurately by removing deposits from the surface of the gate oxide film 8 immediately before the thickness is measured.

Please make the following changes to the paragraph of lines 8-14 of page 14:

Thus, according to the present embodiment, the thickness of the gate oxide film can be measured accurately without being affected by deposits, by removing the deposits from the surface of the gate oxide film 8. In addition, in the present embodiment, even when the [left] <u>exposure</u> period [of time] of the wafer before washing is not known, the

thickness of the gate oxide film can be measured accurately by controlling the [left] exposure period [of time] after washing.

Please make the following changes to the paragraph that begins on line 21 of page 15 and ends on line 3 of page 16:

In the embodiments described above, the thickness of the gate oxide film is in a range of approximately 90Å to 110Å. However, the present invention is especially effective when the thickness of the gate oxide film is less than approximately 100Å. The thinner the oxide film is, the more the rate of [change-variations in] variation in change of the thickness is prominent. Therefore, in such a case, the thickness control according to the present invention is very effective to measure the real thickness precisely. It is apparent that the present invention can be applied to [the] a gate oxide film that is more than 100Å in [a] thickness as well.

Please make the following changes to the paragraph that begins on line 2 of page 24 and ends on line 6 of page 24 (the abstract):

In a process of manufacturing a semiconductor device, after a gate oxide film is formed, [a] the thickness of the gate oxide film is measured by [controlling] measuring an exposure period [a left period of time] defined from a time at which [the formation of] the oxide film is formed to a time at which [the measurement of] the thickness of the oxide film is measured. In addition, if necessary, the measurement of the oxide film is corrected to determine the real thickness based on the exposure period. Accordingly, the thickness of the gate oxide film can be measured accurately.

IN THE CLAIMS

Please cancel claims 8 and 19 without prejudice.

Please amend claims 1-5, 9-16, and 20-22 as follows:

1. (Amended) A method for measuring [a] the thickness of an oxide film, comprising:

forming an oxide film on a substrate;

[controlling] measuring [a left] an exposure period [of time for leaving the oxide film] from a time at which [the formation of] the oxide film is formed to a time at which [measurement of] the thickness of the oxide film is measured; and

measuring the thickness of the oxide film by irradiating the oxide film with light, in accordance with the [left period of time] exposure period.

2. (Amended) The method of claim 1, further comprising correcting the thickness measurement of the oxide film, which is measured when the [left period of time]

exposure period is elapsed [from the formation of the oxide film], based on a relationship between the [left period of time] exposure period and the thickness of the oxide film to obtain [a] the real thickness of the oxide film.

3. (Amended) The method of claim 2, wherein the [thickness of the oxide film is corrected by a formula of] method includes correcting the measurement according to the following formula:

$$y = a \cdot \ln(t) + b$$

in which t is the [left period of time] exposure period from the formation of the oxide film to the measurement of the thickness, y is the thickness of the oxide film measured when the [left period of time] exposure period is elapsed, a is a constant determined based on atmosphere around the oxide film, and b is the real thickness of the oxide film.

4. (Amended) The method of claim 1, wherein the [thickness of the oxide film is measured] method includes measuring the thickness of the oxide film within the [left period of time to include] exposure period so that a [change] variation T in change of thickness [that], which is produced in accordance with the exposure period [left period of time and], satisfies a formula of:

$$\sqrt{S^2 + T^2} \leq U$$

in which S is a variation in thickness that is produced when the oxide film is formed, and U is an allowable latitude in the thickness of the oxide film.

5. (Amended) A method for measuring a thickness of an oxide film, comprising:

forming an oxide film on a substrate;

washing a surface of the oxide film; [and]

measuring an exposure period, which is defined from a time at which the surface of the oxide film is washed to a time at which the thickness of the oxide film is measured; and

measuring [a] the thickness of the oxide film by irradiating the oxide film with light in accordance with the exposure period.

9. (Amended) The method of claim [8] 5, further comprising correcting the thickness measurement of the oxide film, which is measured when the [left period of time] exposure period is elapsed [from the washing of the oxide film], based on a relationship between the [left period of time] exposure period and the thickness of the oxide film to obtain [a] the real thickness of the oxide film.

10. (Amended) The method of claim 9, wherein the [thickness of the oxide film is corrected by a formula of] method includes correcting the measurement according to the following formula:

$$y = a \cdot \ln(t) + b$$

in which t is the [left period of time] exposure period from the washing of the oxide film to the measurement of the thickness, y is the thickness of the oxide film measured when the [left period of time] exposure period is elapsed, a is a constant determined based on the atmosphere around the oxide film, and b is the real thickness of the oxide film.

11. (Amended) The method of claim [8] 5, wherein the [thickness of the oxide film is measured] method includes measuring the thickness of the oxide film within the [left period of time] exposure period from the washing of the surface of the oxide film [to include] so that a [change] variation T in change of thickness [that], which is produced in accordance with the exposure period [left period of time and], satisfies a formula of:

$$\sqrt{S^2 + T^2} \leq U$$

in which S is a variation in thickness that is produced when the oxide film is formed, and U is an allowable latitude in the thickness of the oxide film.

12. (Amended) A method for manufacturing a semiconductor device, comprising:

forming on oxide film;

measuring an exposure period defined from a time at which the oxide film is formed to a time at which a thickness of the oxide film is measured; and

determining the [measuring a] thickness of the oxide film by irradiating the oxide film with light in accordance with [a] the exposure [left] period [of time for leaving the oxide film from the formation of the oxide film];

determining whether the thickness of the oxide film falls in a desirable range; and

performing a succeeding step for manufacturing the semiconductor device when the thickness of the oxide film falls in the desirable range.

13. (Amended) The method of claim 12, further comprising correcting the thickness measurement of the oxide film, which is measured when the [left period of time] exposure period is elapsed [from the formation of the oxide film], based on a relationship between the exposure period and the thickness of the oxide film to obtain [a] the real thickness of the oxide film, wherein:

the succeeding step is performed when the corrected thickness falls in the desirable range.

14. (Amended) The method of claim 13, wherein the [thickness of the oxide film is corrected by a formula of] method includes correcting the measurement according to the following formula:

$$y = a \cdot \ln(t) + b$$

in which t is the [left period of time] exposure period [elapsed from the formation of the oxide film to the measurement of the thickness], y is the thickness of the oxide film measured when the [left period of time] exposure period is elapsed, a is a constant determined based on atmosphere around the oxide film, and b is the real thickness of the oxide film.

15. (Amended) The method of claim 12, wherein the [thickness of the oxide film is measured] method includes measuring the thickness of the oxide film within the exposure period [left period of time to include] so that a [change] variation T in change of thickness [that], which is produced in accordance with the exposure period [left period of time and], satisfies a formula of:

$$\sqrt{S^2 + T^2} \leq U$$

in which S is a variation in thickness that is produced when the oxide film is formed, and U is an allowable latitude in the thickness of the oxide film.

16. (Amended) A method for manufacturing a semiconductor device, comprising:

forming an oxide film;

washing a surface of the oxide film;

measuring an exposure period defined from a time at which the surface of the oxide film is washed to a time at which the thickness of the oxide film is measured; and

[measuring a] determining the thickness of the oxide film by irradiating the oxide film with light in accordance with the exposure period;

determining whether the thickness of the oxide film falls in a desirable range; and

performing a succeeding step for manufacturing the semiconductor device when the thickness of the oxide film falls in the desirable range.

20. (Amended) The method of claim 19, further comprising correcting the thickness measurement of the oxide film, which is measured when the [left period of time] exposure period is elapsed [from the washing of the oxide film], based on a relationship between the [left period of time] exposure period and the thickness of the oxide film to obtain [a] the real thickness of the oxide film.

21. (Amended) The method of claim 20, wherein the [thickness of the oxide film is corrected by a formula of] method includes correcting the measurement according to the following formula:

$$y = a \cdot \ln(t) + b$$

in which t is the [left period of time] exposure period [elapsed from the washing of the oxide film to the measurement of the thickness], y is the thickness of the oxide film measured when the [left period of time] exposure period is elapsed, a is a constant determined based on atmosphere around the oxide film, and b is the real thickness of the oxide film.

22. (Amended) The method of claim 20, wherein the [thickness of the oxide film is measured] method includes measuring the thickness of the oxide film within the [left period of time] exposure period [from the washing of the surface of the oxide film to include] so that a [change] variation T in change of thickness [that], which is produced in accordance with the exposure period [left period of time and], satisfies a formula of:

$$\sqrt{S^2 + T^2} \le U$$

in which S is a variation in thickness that is produced when the oxide film is formed, and U is an allowable latitude in the thickness of the oxide film.